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Discussed are two theories of professional job satisfaction--(1) unidimensional and (2) multidimensional with special reference to Herzberg's two factor theory. A national sample of over 3000 engneering graduates responded to a questionnaire and satisfaction index. Analysis of results revealed that job satisfaction is multidimensional. Job satisfaction seemed most related to (1) a general job characteristic factor and (2) professional challenges. Also identified as factors were (1) status, (2) autonomy, (3) professional recognition, (4) interpersonal relations, and (5) supervisory relations. Certain occupational challenges and personal constraints were examined in terms of (1) function, (2) field, (3) degree level, (4) year of BS graduation, and (5) industrial classification of employer. Job values and perceptions were shown to be complex. (DH)

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THE MULTIVARIATE NATURE OF PROFESSIONAL JOB SATISFACTION*

by

Donald A. Wood and William K. LeBold

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ABSTRACT

The unidimensional versus the multidimensional nature of professional job satisfaction with specific reference to Herzberg's two-factor theory of satisfiers and dissatisfiers are discussed. An overall job satisfaction index and 34 questionnaire items were evaluated by a national sample of over 3,000 engineering graduates; each engineer evaluated the personal importance of each item and the degree to which each characterized his current professional position. Factor analysis suggests that job satisfaction is multidimensional. A general job characteristic factor and a specific factor, Professional Challenge, tend to be most related to overall job satisfaction. Five other factors were also identified: Status, Autonomy, Professional Recognition, Interpersonal Relations and Supervisory Relations. Using item data on overall satisfaction, the two challenges, "no ready-made solutions" and "keeping abreast of latest developments" in addition to "time for family" were examined using function, field, degree level, year of B.S. graduation, and industrial classification of employer to illustrate the complex nature of job values and perceptions. The curvilinear nature of job values are examined and alternative techniques of multivariate analysis are suggested.

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THE MULTIVARIATE NATURE OF PROFESSIONAL JOB SATISFACTION

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Two major developments tend to emphasize the importance for examining professional work attitudes: (1) the increasing demand for professional services in the U.S. labor force (Occupational Outlook Handbook, 1966-67) and (2) the impact of technological change on skills and knowledge required of professionals. With these developments have come changes in the professional salary structure and increased professional involvement in large organizational complexes (Hansen, 1963). The impact of these and other modifications on the professional can often best be evaluated by determining how he feels toward his job and the context in which it is found. Fully understanding the complexities of these reactions and attitudes assumes great consequence if efforts to avoid professional alienation and dissatisfaction in times of technological and economic change are to be successful.

Traditionally, job satisfaction has been interpreted as a unidimensional concept. This viewpoint assumes that any positive job-related or environmentally-related element offering satisfaction to a worker would create dissatisfaction in its absence. As a result, the unidimensional theory requires only an overall job satisfaction measure.

Herzberg's (1959) two-factor job satisfaction theory was the first significant step toward a multidimensional description of job attitudes at the professional level. Herzberg concluded from his study of engineers and accountants that only intrinsic work elements called satisfiers (recognition, achievement, accomplishment, responsibility, and advancement) could generate

job satisfaction. Conversely, extrinsic elements, or dissatisfiers (supervision, wages, interpersonal relations, company policy, working conditions) gave rise to job dissatisfaction. The roles of satisfier and dissatisfier were seen as independent--a satisfier could not evoke dissatisfaction nor could a dissatisfier give rise to job satisfaction.

From this brief account of the two-factor model, it becomes clear that Herzberg imposed multidimensionality by classifying work elements on the basis of attitudes associated with a given occupation and associated environment. However, further research testing the theory (Burke, 1966; Graen, 1965; Ewen, 1964; Dunnette, 1967) has convincingly shown that the intrinsic--extrinsic dichotomy does not adequately reflect the sources of positive and negative job attitudes. In short, both "satisfiers" and "dissatisfiers" appear to be involved both in job satisfaction and dissatisfaction. The presumed exclusiveness of elements has faded to apparent oversimplification.

Further complexity in the nature of job satisfaction is indicated by observed differences between blue-collar and white-collar workers (Centers and Bugental, 1966). As a result of these and similar findings, many researchers have warned against simplifying what is now seen as a very complex system of feelings and reactions (Whitlock, 1960; Yuzuk, 1961; Baumgartel, 1956; Decker, 1955). One way to demonstrate simplification and the problems associated with it is to compare various groups on job satisfaction using only an overall satisfaction index.

Insert Figure 1 here

Figure 1 gives group comparisons for a national sample of approximately 3,000 engineering graduates (Perrucci, 1966) by job function, field of under-

graduate study, degree, year of B.S. degree and employer industrial classification for their 1964 job and their first job after receiving the B.S. It appears the sample was highly satisfied as a whole, with 95% indicating at least some satisfaction. More specifically, 35% were "very satisfied," 41% were "satisfied," 19% reported "average satisfaction," 4% felt "dissatisfied" and only 1% were "very dissatisfied" with their jobs. Those respondents who were either "very satisfied" or "satisfied" with their then current job (1964) are compared by category and also with the total satisfied percentage line of 76%.

Except for the research and engineering management functions, recent graduates, and the research and development classification, no subgroup, regardless of how classified, significantly deviates from the total sample level for overall job satisfaction. One might be tempted to conclude from this rather flat profile that nearly all sub-classifications within the total sample are equally satisfied with their work. However, when one attempts to explain between group similarities and differences on a profile using overall satisfaction indices, the inadequacy of the unidimensional approach is immediately apparent. For example, it can be concluded from Figure 1 that those in research and design are very nearly equal in job satisfaction. But it is not known whether subjects in these functions are satisfied with <u>the same things</u> or whether they reached the same overall level through different routes. Here, one can only conclude the former is true and merely speculate on the latter. The same unidimensional handicap would hold true in trying to determine <u>why</u> the young graduates are more dissatisfied than most other groups. It is simply not discernible from the table why they are as satisfied as they are nor is it known where their dissatisfaction in greatest.

A major phase of attitude research attempting to answer these questions

has centered on the use of factor analysis (Stogdill, 1966; Hearnshaw, 1954; Harrison, 1960; Handyside, 1961). The utility of this multivariate technique for identifying the various dimensions of job attitudes has been widely recognized (Wherry, 1958; Guion, 1958). With the shortcomings of the unidimensional and two-factor theories well in mind, factor analysis (Cooley and Lohnes, 1962) was used on selected job statements from the questionnaire survey data in an attempt to examine the multivariate nature of professional job satisfaction.

Responses to the 34 statements concerning various aspects of the engineer's job were made in two ways (see Appendix A). First, the respondent was to indicate how important each item was to him personally (choices were very important, some importance, none). Second, the respondent indicated how characteristic the item was of his present position (choices were very characteristic, some characteristic, none). A list of items, attitude factors and item loadings on the factors resulting from a principal component solution (orthogonal rotation) of responses are presented in Table I.

Insert Table I here

Since two responses were made to each statement and the loading of the overall job satisfaction scale was desired, the intercorrelation matrix prior to factoring contained 69 variables in all. Loadings from characteristic responses are enclosed in parentheses and only loadings of .25 are given and considered significant in factor interpretation.

Results from the factor analysis show the suspected complexity and multivariate nature of engineering job satisfaction. Of particular interest is the finding that the characteristic responses made to each item all highly load

on the first factor--labeled General Job Satisfaction. None of the importance item loadings were .25 or above on this factor. The highest loading for the overall job satisfaction scale, .39, was also on this general factor. From this it would appear that a global index of job attitudes is more closely associated to what this professional sample sees as characteristic of their job than to what it values as important. By comparing the characteristic and importance loadings for the remaining six factors, it can be noted that Factor II, Professional Challenge, is the only factor with characteristic values greater than those for importance with respect to the higher loading items. For this factor, these include "using skills," "no ready-made solutions," "keeping abreast" and "working with interested colleagues." The overall scale loaded next highest on this factor indicating that the relationship between overall satisfaction and specific job attitudes may be dependent, in part, on the discrepancy between what a person values and what characterizes his job. Since the Job Status, Job Autonomy, Professional Recognition, Supervisory Relations and Interpersonal Relations factors, all with the lower characteristic values, have almost negligible overall scale loadings, support for the importance--characteristic difference is again indicated.

From correlating the overall satisfaction scale with importance and characteristic responses (also found in Table I), little relation to values was found, but substantial relation with item characteristics was true for nearly all items. This seems to verify the prominence of job characteristics in overall satisfaction found in the factor analysis, but the low importance correlations may simply reflect an underestimate of the true relationship which may be more curvilinear than linear (the correlation coefficient used assumed linearity). (See Appendix B)

As a result of factoring a large number of items, several distinct and specific attitude dimensions have emerged from the sample data which are assumed to better represent the complex phenomenon of professional job satisfaction. With more specific attitude referents available, it is possible to make much more definitive discriminations between groups on several different aspects so that similarities and differences can be better pinpointed. For example, Figure 2 gives importance and characteristic profiles (in percentages for "very important" and "very characteristic") for all classifications using the "no ready-made solutions" item, found to best represent the Professional Challenge factor. Due to the demonstrated value of

Insert Figure 2 here

the discrepancy between importance and characteristic as an indicator of overall job satisfaction, the profile differences between groups appear to be significant in a factor attitude analysis. The research and design groups, though very similar in overall satisfaction (Figure 1), show very different profile differences here. The design group with a much larger discrepancy would appear to be more dissatisfied with job challenges than the research group. To show that this item is not atypical, the "keeping abreast" item, also from the Professional Challenge factor, is profiled in like manner in Figure 3.

Insert Figure 3 here

It can be seen that the research-design discrepancy differences are in the same direction, although the contrast is not as marked as in the "no ready-made solutions" item.

From Figures 2 and 3, it is also possible to shed some light on the previously posed problem of why more recent graduates seemed more dissatisfied than older graduates. For both items, the 1961-64 B.S. group has larger discrepancies between importance and characteristic responses than does any other B.S. category.

These figures pose many other interesting comparisons which cannot be discussed in a detailed manner here. However, from only the several brief inspections made above, it does appear that a multidimensional look at job satisfaction using the importance--characteristic profiles offers many valuable insights for better understanding the concept and in making group attitude comparisons more meaningful.

An example of how different "routes" to similar overall satisfaction scores can occur is shown in Figure 4. The top profile repeats the overall

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Insert Figure 4 here

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satisfaction indices from Figure 1 showing similarity in attitudes between classes, except for the last group. The very characteristic profiles for "keeping abreast" (Professional Challenge Factor) and for "time for family," representing a different satisfaction dimension, Interpersonal Relations, are given in the lower portion. The profiles are nearly opposite in slope: whereas "time for family" becomes more and more characteristic of the younger B.S. groups, "keeping abreast" becomes progressively less so. This kind of profile variability seems to suggest how summing across attitude dimensions could "cancel" out such differences giving the rather bland overall profiles found in Figure 1 and here in Figure 4.

Conclusion

Several summary statements about a multivariate approach to professional job satisfaction dimensionality seem necessary. First, with the finding of a general job satisfaction factor in the above study, one cannot hastily abandon the notion that at least some part of job attitudes includes an overall, global or unidimensional component. What does appear significant here is that the identification of specific factors in addition to the general component has provided new insights and group comparison techniques heretofore obscured by a one-factor approach. As far as this study is concerned, job satisfaction is comprised of both general and specific features. Second, any study of attitude dimensions is somewhat bound by the method and statistics used. The initial list of questionnaire items can greatly affect the dimensions resulting from a factor analysis. Also, violating linearity assumptions in computing the item intercorrelation matrix can distort, in unknown ways, the factor matrix emanating from it. Further research is needed here to investigate the possible curvilinearity in the importance--job satisfaction correlation and its affect on the resulting factor structure. Third, the correlates of professional attitudes, though not of major concern here, seem suspect of the same oversimplification that is still all too prevalent in job satisfaction research. Of particular concern is the relationship between attitudes and scientific productivity--a criterion again often measured in a unitary manner. Much greater emphasis is needed in viewing scientific productivity as a complex phenomenon with interrelated components such as creativity, quality and quantity of output. It is very difficult to study professional production of performance using a single measure, a problem we have attempted to define on the attitude side. Only when job satisfaction and work performance for the professional are examined simultaneously in a multivariate fashion

will their inherent complexities and interrelationships be discovered.

In addition to factor analysis, we are examining the emerging multivariate statistical techniques, especially multiple discriminant analysis and canonical correlation. The purpose in using these techniques is to investigate further the complex relations and interrelations between background, education, experience, productivity, values, perceptions and job satisfaction.

TABLE 1

SIGNIFICANT FACTOR LOADINGS FOR OVERALL JOB SATISFACTION AND IMPORTANCE-CHARACTERISTICS OF DETAILED JOB ELEMENTS*

FACTOR I General Job Satisfaction	FACTOR II Professional Challenge	FACTOR III Job Status	FACTOR IV Job Autonomy		FACTOR V Professional Recognition	FACTOR VI Interpersonal Relations	FACTOR VII Supervisory Relations	CORRELATIONS WITH OVERALL SATISFACTION
39	25			Job Satisfaction (Overall)				
(41)	40 (13)			1. Use own skills and abilities				11 (39)
(33)	47 (32)			2. Problems with no ready solution				12 (27)
(41)	43 (49)			3. Keep abreast of developments	36	26		10 (28)
(39)	46 (33)			4. Work with interested colleagues	42 (28)	26		11 (25)
(33)		54 (41)		5. To advance self economically		26		07 (29)
(47)		50 (42)		6. Enhance status and prestige	26			06 (20)
(32)		54 (38)		7. Clearly visible career line		31		03 (25)
(41)		36		8. Promotion to those who merit it		31		09 (24)
(30)		40 (30)		9. Move into management career			32	10 (25)
(39)				10. Sufficient time for family		37 (29)		06 (06)
(28)			30 (30)	11. Relatively free of supervision				06 (06)
(40)			56 (32)	12. Chance to make most decisions		25		08 (29)
(30)			50 (32)	13. Freedom to manage own work		25		11 (27)
(38)				14. Clear expectations from superior		40 (29)		02 (20)
(42)				15. Work with able colleagues	55 (40)	31		04 (21)
(40)				16. Respect for technical achievement	49 (40)	34		09 (23)
(39)	26			17. Member of professional community	61 (32)			07 (15)
(32)				18. Treatment as a professional	47 (35)	31		03 (27)
(38)				19. Free to publish contributions	67 (49)			05 (13)
(45)				20. Contribute scientific knowledge	60 (36)			07 (20)
(40)				21. In a highly regarded organization	50 (40)			09 (18)
(41)				22. To be able to count on others		44 (30)	27	09 (24)
(43)				23. People like to work together		31 (27)		07 (26)
(40)				24. Get credit for accomplishments		45		06 (29)
(37)				25. Superior backing for own ideas		48		10 (30)
(47)				26. To supervise cooperative people		40	50 (16)	10 (23)
(40)				27. To supervise responsible people		32	63 (16)	13 (24)
(39)				28. Express own opinions freely		46 (27)		10 (26)
(47)				29. Reasonable time for projects	31	52 (33)		02 (14)
(49)				30. Make significant contributions	49 (39)	25	34 (31)	07 (22)
(47)	32			31. Work with people, not things		25	45 (41)	10 (17)
(33)				32. Have a stable, secure future		50 (26)		09 (10)
(37)	43			33. Chance to exercise leadership		25	51 (48)	11 (30)
(36)				34. Opportunity to help others	26	32	45 (47)	08 (20)

*Loadings for characteristic are in parentheses (), importance are not. Decimal points have been omitted.

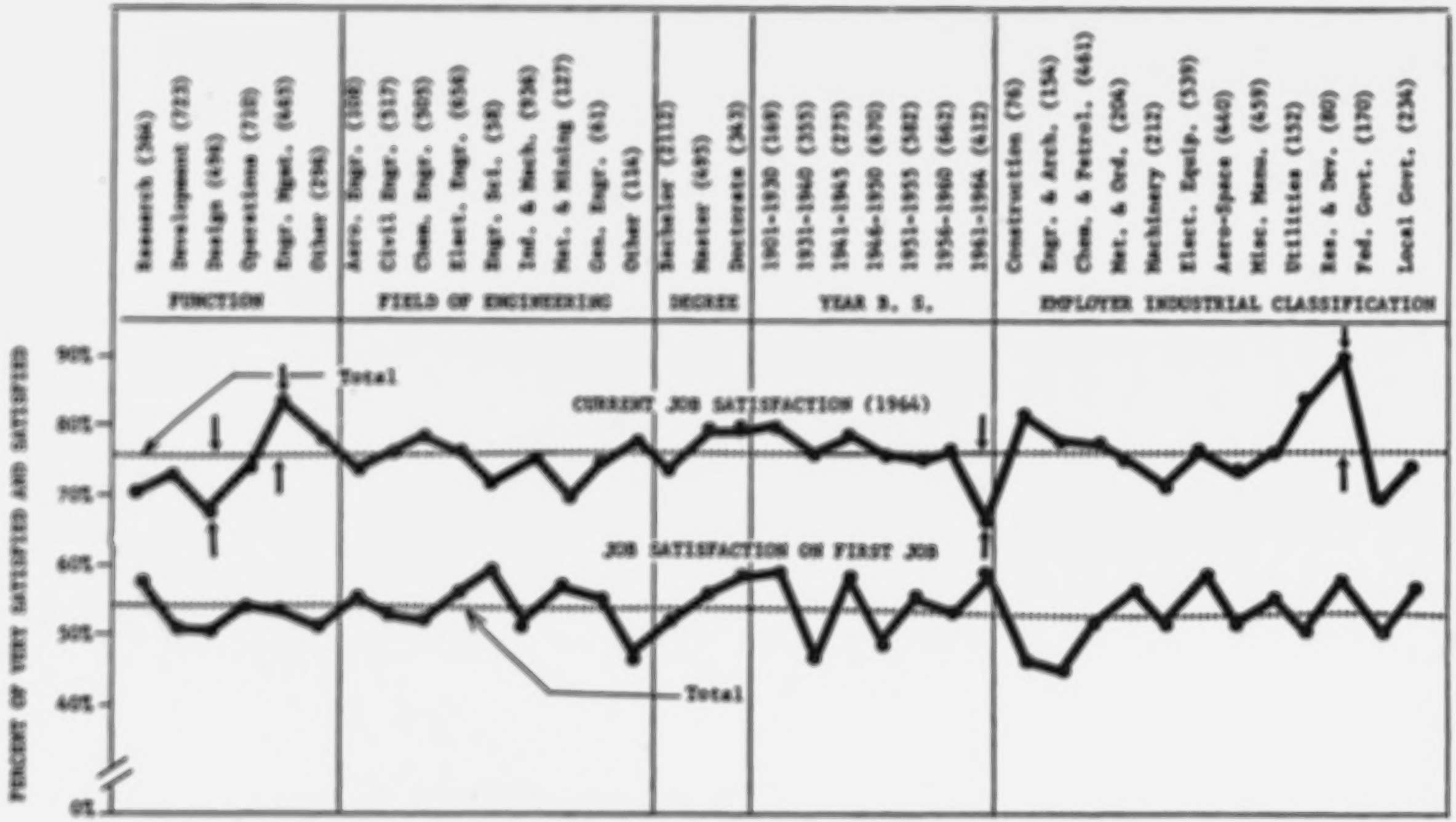

Figure 1. Percentage of a national sample of 3234 engineering graduates who indicated they were either very satisfied or satisfied with their current job (1964) and initial job after receiving B.S. degree by current job function, field of undergraduate study, highest degree level, year receiving B.S. degree and current industrial classification of employer. Number of cases given in parentheses for each classification group is the number that answered the overall satisfaction item. Arrows indicate groups deviating significantly (.01 level) from the total.

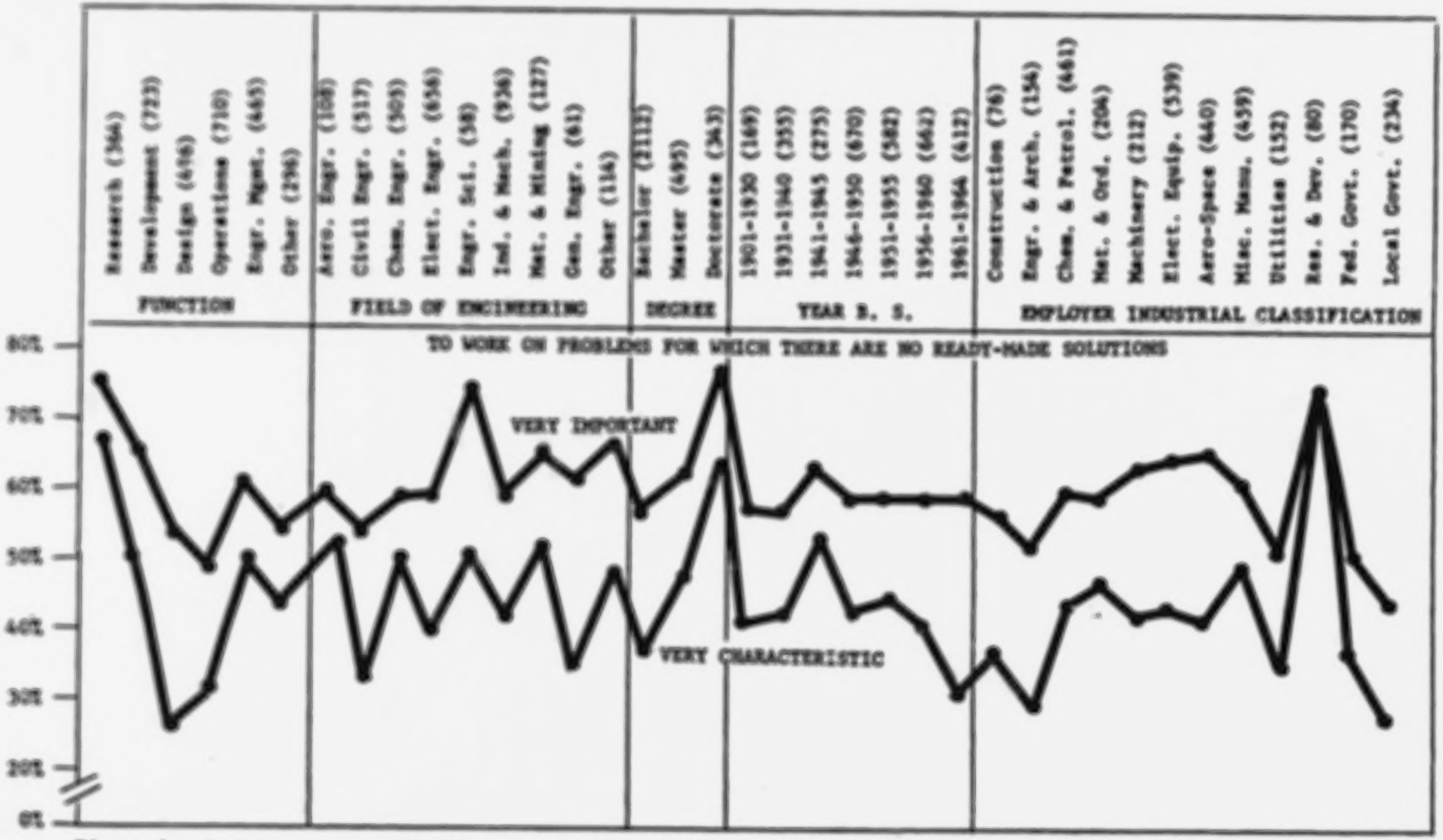

Figure 2. Percentage of national engineering graduate sample indicating "no ready-made solutions" was very important to them personally and very characteristic of their current position (1964) by current job function, field of undergraduate study, highest degree level, year receiving B.S. degree and current industrial classification of employer. Numbers in parentheses for each classification group are approximations since the importance-characteristic N's often differed due to respondent omissions and errors.

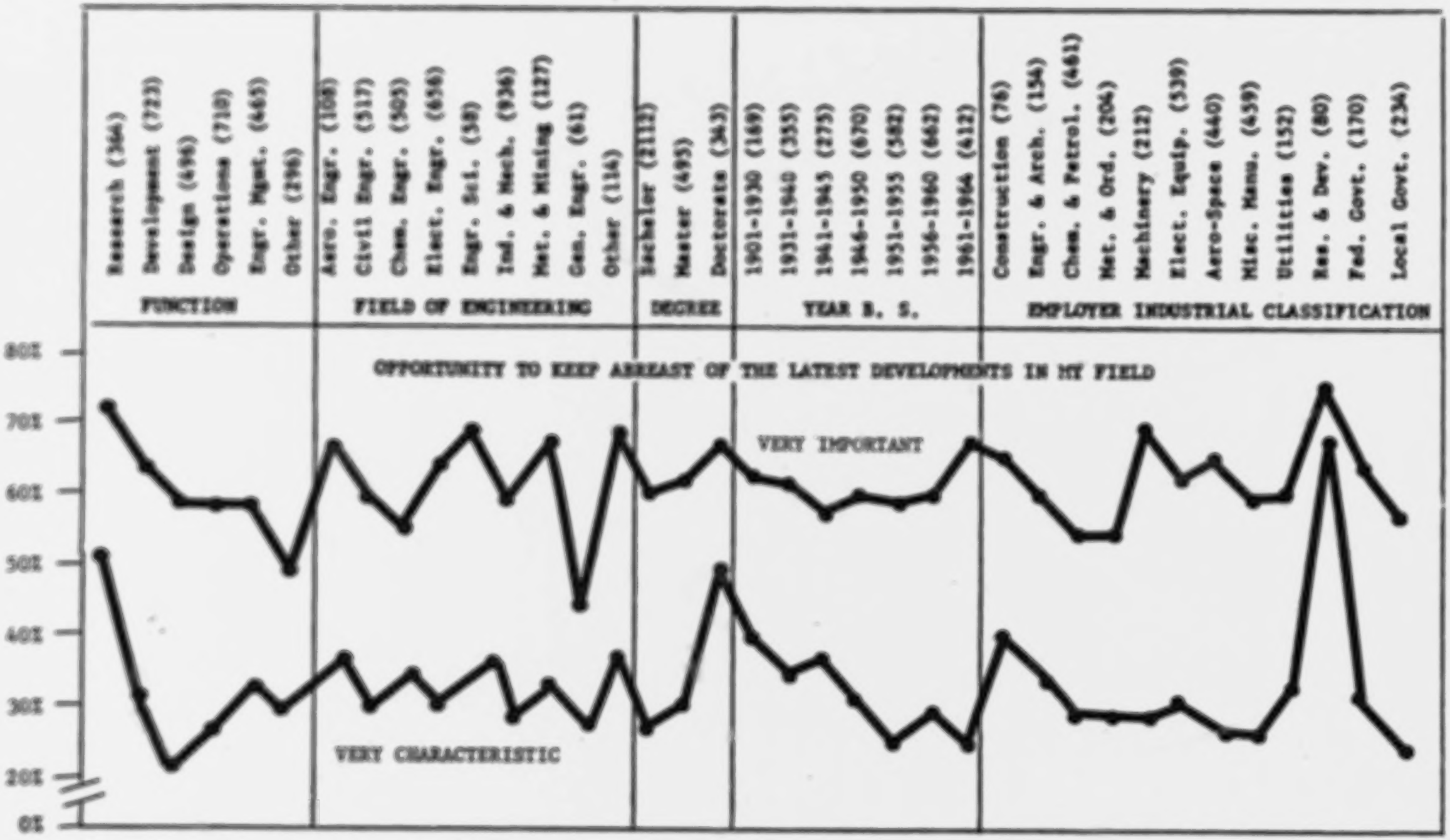

Figure 3. Percentage of national engineering graduate sample indicating "keeping abreast" was very important to them personally and very characteristic of their current position (1964) by current job function, field of undergraduate study, highest degree level, year receiving B.S. degree and current industrial classification of employer. Numbers in parentheses for each classification group are approximations since the importance-characteristic N's often differed due to respondent omissions and errors.

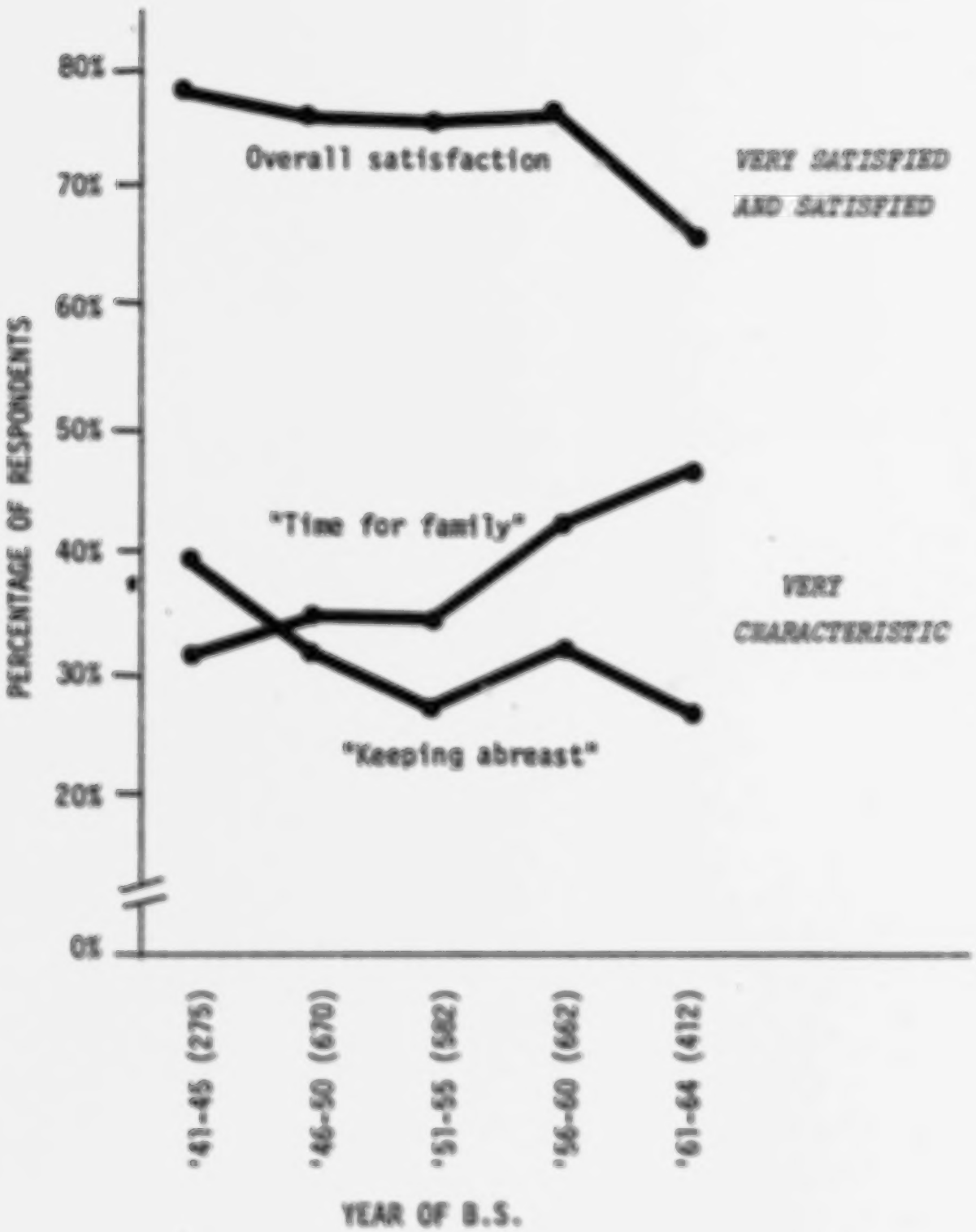

Figure 4. Top profile is the overall satisfaction percentages for the national engineering sample according to year B.S. degree received showing high group similarity and recent graduate decrease. Because of time-length differences, the 1901-1930 and 1931-1940 B.S. groups are not included in the profile percentages. Since survey was conducted in 1964, the latest B.S. group was restricted to a 4 year period. Two bottom profiles indicate percentages within each classification who said "keeping abreast" (Factor I, Professional Challenge) and "time for family" (Factor VI, Interpersonal Relations) was very characteristic of their current position (1964). Opposite item profile slopes for the two job characteristics shown here demonstrate how "similar" overall satisfaction indices can obscure marked item level differences.

APPENDIX A

The following is a list of the 34 job statements and the percentage of a national engineering sample (N=3234) who evaluated each as very important (VI) to them personally and very characteristic (VC) of their professional position:

VI	VC		
85	48	1.	To use my skills and abilities in challenging work.
61	44	2.	To work on problems for which there are no ready-made solutions.
62	32	3.	Opportunity to keep abreast of the latest developments in my field.
46	28	4.	Opportunity to work with colleagues who are interested in the latest developments in their field.
58	23	5.	Opportunity to advance myself economically.
13	08	6.	Opportunity to enhance social status and prestige.
33	11	7.	To have a clearly visible career line of increasing rewards and promotions.
78	26	8.	To work in a setting where promotion goes to those who merit it most.
41	24	9.	To have an opportunity to move into a management career.
59	37	10.	A position which leaves sufficient time to devote to my family.
22	24	11.	A position which leaves me relatively free of supervision.
60	36	12.	An opportunity to make most decisions connected with my work.
62	44	13.	A large degree of freedom to manage my own work.
48	22	14.	To work under superiors who make it quite clear what they expect of me.
35	23	15.	Association with other engineers and scientists of recognized ability.
42	26	16.	To have the respect of my colleagues because of my technical achievement.
11	11	17.	To be a member of a professional community "outside" of the particular place I am employed.
46	26	18.	"Treatment as a professional" by my superiors and higher management.
15	22	19.	To be free to publish non-confidential scientific contributions.
16	12	20.	Opportunity to contribute to basic scientific knowledge.
19	21	21.	Membership in an organization that is highly regarded by people in my profession.
61	34	22.	To be able to count on others for the backing and co-operation necessary for accomplishing my own work.
77	33	23.	To have a position where people are interested in working together and not encouraging petty jealousies.
65	33	24.	To get credit for my accomplishments.
65	35	25.	To have the backing of my superiors on ideas that I wish to try out.
56	30	26.	To supervise people who are co-operative and willing to learn.
59	25	27.	To supervise people who are willing to assume responsibility.
70	46	28.	To be able to express my opinions and feelings freely to those whom I work with.
41	19	29.	To work on projects where I have a reasonable amount of time for completion.
26	12	30.	To have the opportunity to make significant contributions to society.
27	28	31.	To give me an opportunity to work with other people rather than things.
39	29	32.	To enable me to look forward to a stable secure future.
48	30	33.	To give me a chance to exercise leadership.
37	25	34.	To give me an opportunity to help others.

APPENDIX B

The data below is based on an independent survey of Purdue engineering and science graduates. It is included to indicate the linear-curvilinear relationship of the importance and the characteristic dimensions to overall job satisfaction.

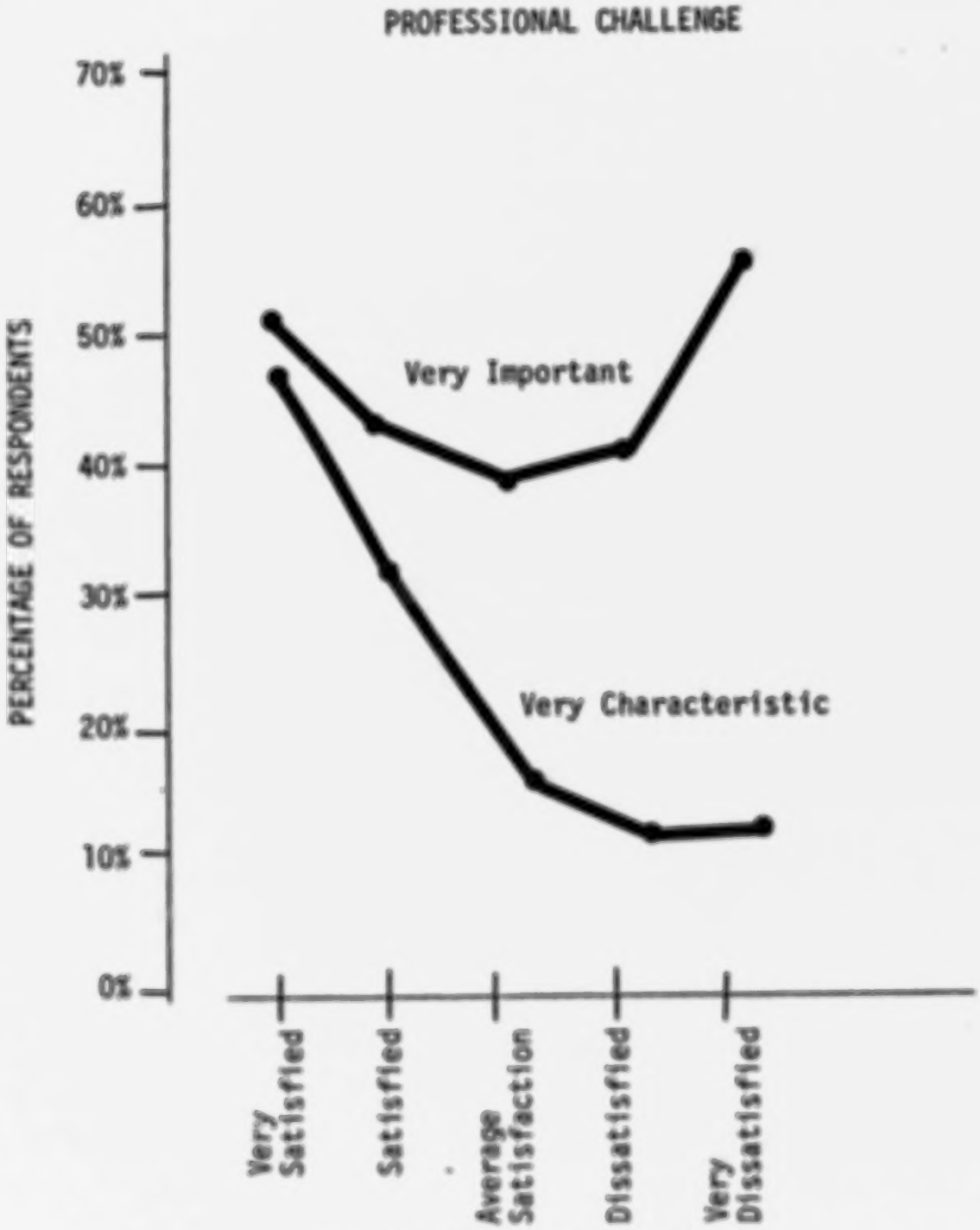

Figure 5. Average very important and very characteristic response percentages for items significantly loading on Professional Challenge, by degree of current (1965) overall job satisfaction for a Purdue Alumni engineering and science graduate sample. (N is approximately 3550, since N's varied somewhat from item to item). The curvilinearity evidenced here resulting from plotting the importance dimension across the overall satisfaction scale is typical for all factors identified in the sample analysis. This finding may well question the linearity assumption used in computing item correlations for importance. Linearity appears more pronounced in the characteristic (lower) profile. Of particular significance is the increasing difference between the response dimension of importance and characteristic as overall job satisfaction decreases and overall job dissatisfaction increases. (Perrucci, 1967 ;LeBold, 1967)

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